AMENDMENTS TO THE CLAIMS

Please amend the claims as follows.

1. (Currently Amended) A gallium nitride-based compound semiconductor device comprising:

   a substrate;

   a first superlattice layer which is formed above the substrate and in which an n-type AlGaN layer and an n-type GaN layer are alternately layered;

   a multiple quantum well layer which is formed above the first superlattice layer and in which an ~~GaN-based quantum~~AlInGaN well layer and an ~~GaN-based quantum~~AlInGaN barrier layer are alternately layered; and

   a second superlattice layer which is formed above the multiple quantum well layer and in which a p-type AlGaN layer and a p-type GaN layer are alternately layered.

2. (Original) A gallium nitride-based compound semiconductor device according to claim 1, wherein a buffer layer, a first GaN-based layer which is formed above the buffer layer, and an n-type GaN-based layer which is formed above the first GaN-based layer are provided between the substrate and the first superlattice layer; a second GaN-based layer is provided between the first superlattice layer and the multiple quantum well layer; and a p-type GaN layer is provided above the second superlattice layer.

3. (Currently Amended) A gallium nitride-based compound semiconductor device comprising:

   a substrate;

   a first superlattice layer which is formed above the substrate and in which an n-type AlGaN layer and an n-type GaN layer are alternately layered;

   a multiple quantum well layer which is formed above the first superlattice layer and in which a GaN-based quantum well layer and a GaN-based quantum barrier layer are alternately layered;

   a second superlattice layer which is formed above the multiple quantum well layer and in which a p-type AlGaN layer and a p-type GaN layer are alternately layered;

a buffer layer, a first GaN-based layer which is formed above the buffer layer, and an n-type GaN-based layer which is formed above the first GaN-based layer are provided between the substrate and the first superlattice layer;

a second GaN-based layer is provided between the first superlattice layer and the multiple quantum well layer; and

a p-type GaN layer is provided above the second superlattice layer;

~~A gallium nitride-based compound semiconductor device according to claim 2,~~ wherein

the first GaN-based layer has a structure in which an SiN layer is inserted in a GaN layer, and

the second GaN-based layer has an AlGaN layer.

4. (Currently Amended) A gallium nitride-based compound semiconductor device according to claim [[1]]3, wherein

a compositional ratio of Al in the GaN-based quantum barrier layer in the multiple quantum well layer is larger than compositional ratios of Al in the first superlattice layer and the second superlattice layer.

5. (Currently Amended) A gallium nitride-based compound semiconductor device according to claim [[1]]3, wherein

each of compositional ratios of Al in the AlGaN layers in the first superlattice layer and in the second superlattice layer is 5% or greater and 25% or smaller;

a compositional ratio of In in the InGaN quantum well layer or the AlInGaN quantum well layer in the multiple quantum well layer is 3% or greater and 20% or smaller;

a compositional ratio of Al in the AlGaN quantum barrier layer or the AlInGaN quantum barrier layer in the multiple quantum well layer is 1% or greater and 30% or smaller; and

a band gap of the quantum well layer is smaller than a band gap of the quantum barrier layer.

6. (Currently Amended) A gallium nitride-based compound semiconductor device according to claim [[1]]3, wherein

each of thicknesses of the AlGaN layer and the GaN layer in the first superlattice layer is 1 nm or greater and 10 nm or smaller;

a thickness of the quantum well layer in the multiple quantum well layer is 1 nm or greater and 5 nm or smaller;

a thickness of the quantum barrier layer in the multiple quantum well layer is 2 nm or greater and 50 nm or smaller;

a thickness of the AlGaN layer in the second superlattice layer is 0.5 nm or greater and 10 nm or smaller; and

a thickness of the GaN layer in the second super lattice layer is 0.5 nm or greater and 5 nm or smaller.

7. (Currently Amended) A gallium nitride-based compound semiconductor device according to claim [[1]]3, wherein

a thickness of the first GaN-based layer is 500 nm or greater and 3000 nm or smaller;

a thickness of the n-type GaN-based layer is 500 nm or greater and 10000 nm or smaller;

each of thicknesses of the AlGaN layer and the GaN layer in the first superlattice layer is 1 nm or greater and 10 nm or smaller;

a thickness of the second GaN-based layer is 5 nm or greater and 100 nm or smaller;

a thickness of the quantum well layer in the multiple quantum well layer is 1 nm or greater and 5 nm or smaller;

a thickness of the quantum barrier layer in the multiple quantum well layer is 2 nm or greater and 50 nm or smaller;

a thickness of the AlGaN layer in the second superlattice layer is 0.5 nm or greater and 10 nm or smaller;

a thickness of the GaN layer in the second superlattice layer is 0.5 nm or greater and 5 nm or smaller; and

a thickness of the p-type GaN-based layer is 5 nm or greater and 50 nm or smaller.

8. (Currently Amended) A gallium nitride-based compound semiconductor device according to claim [[1]]3, wherein

each of thicknesses of the AlGaN layer and the GaN layer in the first superlattice layer is 1.5 nm or greater and 5 nm or smaller;

a thickness of the quantum well layer in the multiple quantum well layer is 1 nm or greater and 2 nm or smaller;

a thickness of the quantum barrier layer in the multiple quantum well layer is 6 nm or greater and 20 nm or smaller;

a thickness of the AlGaN layer in the second superlattice layer is 1 nm or greater and 6 nm or smaller, and

a thickness of the GaN layer in the second superlattice layer is 0.5 nm or greater and 3 nm or smaller.

9. (Currently Amended) A gallium nitride-based compound semiconductor device according to claim [[1]]3, wherein

a thickness of the first GaN-based layer is 1500 nm or greater and 3000 nm or smaller;

a thickness of the n-type GaN-based layer is 1000 nm or greater and 2000 nm or smaller;

each of thicknesses of the AlGaN layer and the GaN layer in the first superlattice layer is 1.5 nm or greater and 5 nm or smaller;

a thickness of the second GaN-based layer is 20 nm or greater and 40 nm or smaller;

a thickness of the quantum well layer in the multiple quantum well layer is 1 nm or greater and 2 nm or smaller;

a thickness of the quantum barrier layer in the multiple quantum well layer is 6 nm or greater and 20 nm or smaller;

a thickness of the AlGaN layer in the second superlattice layer is 1 nm or greater and 6 nm or smaller;

a thickness of the GaN layer in the second superlattice layer is 0.5 nm or greater and 3 nm or smaller; and

a thickness of the p-type GaN-based layer is 10 nm or greater and 40 nm or smaller.

10. (Currently Amended) A gallium nitride-based compound semiconductor device comprising:

a substrate;

an n-type AlGaN layer which is formed above the substrate;

a multiple quantum well layer which is formed above the n-type AlGaN layer and in which an ~~GaN-based quantum~~AlInGaN well layer and an ~~GaN-based quantum~~AlInGaN barrier layer are alternately layered; and

a p-type AlGaN layer which is formed above the multiple quantum well layer.

11. (Withdrawn) A gallium nitride-based compound semiconductor device according to claim 10, wherein a buffer layer, a first GaN-based layer which is formed above the buffer layer, and an n-type GaN-based layer which is formed above the first GaN-based layer are provided between the substrate and the n-type AlGaN layer; a second GaN-based layer is provided between the n-type AlGaN layer and the multiple quantum well layer; and a p-type GaN-based layer is provided above the p-type AlGaN layer.

12. (Withdrawn) A gallium nitride-based compound semiconductor device according to claim 10, wherein a compositional ratio of Al in the ~~GaN-based quantum~~AlInGaN barrier layer in the multiple quantum well layer is larger than compositional ratios of Al in the n-type AlGaN layer and the p-type AlGaN layer.

13. (Withdrawn) A gallium nitride-based compound semiconductor device according to claim 10, wherein each of compositional ratios of Al in the n-type AlGaN layer and in the p-type AlGaN layer is 5% or greater and 25% or smaller; a compositional ratio of In in ~~the InGaN quantum well layer or~~ the AlInGaN ~~quantum~~ well layer in the multiple quantum well layer is 3% or greater and 20% or smaller; a compositional ratio of Al in the AlInGaN ~~quantum~~ barrier layer ~~or the AlGaN quantum barrier layer~~ in the multiple quantum well layer is 1% or greater and 30% or smaller, and a band gap of the ~~quantum~~ well layer is smaller than a band gap of the ~~quantum~~ barrier layer.

14. (Withdrawn) A gallium nitride-based compound semiconductor device according to claim 10, wherein a thickness of the n-type AlGaN layer is 50 nm or greater and 500 nm or smaller; a thickness of the ~~quantum~~ well layer in the multiple quantum well layer is 1 nm or greater and 5 nm or smaller; a thickness of the ~~quantum~~ barrier layer in the multiple quantum well layer is 2 nm or greater and 50 nm or smaller; and a thickness of the p-type AlGaN layer is 50 nm or greater and 500 nm or smaller.

15. (Withdrawn) A gallium nitride-based compound semiconductor device according to claim 11, wherein a thickness of the first GaN-based layer is 500 nm or greater and 3000 nm or smaller; a thickness of the n-type GaN-based layer is 500 nm or greater and 10000 nm or smaller; a thickness of the n-type AlGaN layer is 50 nm or greater and 500 nm or smaller; a thickness of the second GaN-based layer is 5 nm or greater and 100 nm or smaller; a thickness of the ~~quantum~~ well layer in the multiple quantum well layer is 1 nm or greater and 5 nm or smaller; a thickness of the ~~quantum~~ barrier layer in the multiple quantum well layer is 2 nm or greater and 50 nm or smaller; a thickness of the p-type AlGaN layer is 50 nm or greater and 500 nm or smaller; and a thickness of the p-type GaN-based layer is 5 nm or greater and 50 nm or smaller.

16. (Withdrawn) A gallium nitride-based compound semiconductor device according to claim 10, wherein a thickness of the n-type AlGaN layer is 70 nm or greater and 300 nm or smaller; a thickness of the ~~quantum~~ well layer in the multiple quantum well layer is 1 nm or greater and 2 nm or smaller; a thickness of the ~~quantum~~ barrier layer in the multiple quantum well layer is 6 nm or greater and 20 nm or smaller; and a thickness of the p-type AlGaN layer is 70 nm or greater and 200 nm or smaller.

17. (Withdrawn) A gallium nitride-based compound semiconductor device according to claim 11, wherein a thickness of the first GaN-based layer is 1500 nm or greater and 3000 nm or smaller; a thickness of the n-type GaN-based layer is 1000 nm or greater and 2000 nm or smaller; a thickness of the n-type AlGaN layer is 70 nm or greater and 300 nm or smaller; a thickness of the second GaN-based layer is 20 nm or greater and 40 nm or smaller; a thickness of the ~~quantum~~ well layer in the multiple quantum well layer is 1 nm or greater and 2 nm or smaller; a thickness of the ~~quantum~~ barrier layer in the multiple quantum well layer is 6 nm or greater and 20 nm or smaller; a thickness of the p-type AlGaN layer is 70 nm or greater and 200 nm or smaller; and a thickness of the p-type GaN-based layer is 10 nm or greater and 40 nm or smaller.

18. (Currently Amended) A method for manufacturing a gallium nitride-based compound-semiconductor device according to claim [[2]]3 ~~through MOCVD~~, wherein

the buffer layer is formed on the substrate at a temperature of 450° C or higher and 600° C or lower;

the first GaN-based layer, the n-type GaN-based layer, and the first superlattice layer are sequentially formed on the buffer layer at a temperature of 1050° C or higher and 1100° C or lower;

the second GaN-based layer and the multiple quantum well layer are sequentially formed on the first superlattice layer at a temperature of 800° C or higher and 900° C or lower; and

the second superlattice layer and the p-type GaN-based layer are sequentially formed on the multiple quantum well layer at a temperature of 950° C or higher and 1025° C or lower.

19. (Withdrawn) A method for manufacturing a gallium nitride-based compound semiconductor device according to claim 11 ~~through MOCVD~~, wherein the buffer layer is formed on the substrate at a temperature of 450° C or higher and 600° C or lower; the first GaN-based layer, the n-type GaN-based layer, and the n-type AlGaN layer are sequentially formed on the buffer layer at a temperature of 1050° C or higher and 1100° C or lower; the second GaN-based layer and the multiple quantum well layer are sequentially formed on the n-type AlGaN layer at a temperature of 800° C or higher and 900° C or lower; and the p-type AlGaN layer and the p-type GaN-based layer are sequentially formed on the multiple quantum well layer at a temperature of 950° C or higher and 1025° C or lower.

20. (Currently Amended) A gallium nitride-based compound semiconductor device according to ~~any one of~~ claim[[s 2]]3 ~~through 11~~, further comprising:

an n electrode which is connected to the n-type GaN-based layer;

a p electrode which is connected to the p-type GaN-based layer; and

a power supply which applies a voltage between the n electrode and the p electrode.

21. (Withdrawn) A device which uses a gallium nitride-based compound semiconductor device according to claim 20 as a light source and irradiates light having a wavelength of 400 nm or shorter.

22. (New) A gallium nitride-based compound semiconductor device according to claim 10, further comprising:

an n electrode which is connected to the n-type GaN-based layer;

a p electrode which is connected to the p-type GaN-based layer; and

a power supply which applies a voltage between the n electrode and the p electrode.